

## Claims

1. A process for preparing a homopolymer and/or copolymer having an irregular particle structure and  
a melt flow index (MFR of from 1.3 g/10 min to  
190/15) 10 g/10 min,  
a molecular weight distribution of from 3 to 30,  
 $M_w/M_n$   
a bulk density of from 0.05 g/cc to 0.4 g/cc and  
a particle size of from 5  $\mu\text{m}$  to 300  $\mu\text{m}$ ,  
5 which comprises polymerizing the monomers in the presence of a  
mixed catalyst comprising a titanium component and an organic  
aluminum compound and the presence of a molar mass regulator.
2. The process for preparing a homopolymer and/or copolymer having  
an irregular particle structure as claimed in claim 1, wherein  
10 the melt flow index (MFR is from 1.3 g/10 min to  
190/15) 10 g/10 min,  
the molecular weight is from 3 to 10,  
distribution  $M_w/M_n$   
the bulk density is from 0.1 g/cc to 0.4 g/cc and  
the particle size is from 20  $\mu\text{m}$  to 200  $\mu\text{m}$ .
3. The process for preparing a homopolymer and/or copolymer having  
an irregular particle structure as claimed in claim 1 or 2, wherein  
the melt flow index (MFR is from 1.4 g/10 min to 5 g/10 min,  
190/15)  
the molecular weight is from 4 to 8,  
distribution  $M_w/M_n$   
the bulk density is from 0.13 g/cc to 0.3 g/cc and  
the particle size is from 60  $\mu\text{m}$  to 180  $\mu\text{m}$ .
- 15 4. The process for preparing a homopolymer and/or copolymer having  
an irregular particle structure as claimed in one or more of claims 1  
to 3, wherein  
the melt flow index (MFR is from 1.4 g/10 min to 3 g/10 min,  
190/15)  
the molecular weight is from 4 to 8,

distribution  $M_w/M_n$

the bulk density

is from 0.15 g/cc to 0.28 g/cc and

the particle size

is from 60  $\mu\text{m}$  to 160  $\mu\text{m}$ .

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5. The process for preparing a homopolymer and/or copolymer having an irregular particle structure as claimed in one or more of claims 1 to 4, wherein the polymerization is carried out at a temperature of from 30°C to 130°C and a pressure of from 0.05 MPa to 4 MPa.
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6. The process for preparing a homopolymer and/or copolymer having an irregular particle structure as claimed in one or more of claims 1 to 5, wherein the polymerization is carried out at a temperature of from 50°C to 90°C.
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7. A process for preparing a catalyst for the preparation of a homopolymer and/or copolymer having an irregular particle structure, which comprises reacting a Ti(IV) compound with an aluminum compound at from -40°C to 50°C in a molar ratio of from 1:0.01 to 1:4 for from 0.5 minute to 60 minutes.
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8. The process for preparing a catalyst for the preparation of a homopolymer and/or copolymer having an irregular particle structure as claimed in claim 7, wherein the aluminum component is added to a suspension medium in a ratio to the Ti component of Al:Ti = 1:1 - 30:1, preferably 2:1 to 20:1.
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9. The process for preparing a catalyst for preparing a homopolymer and/or copolymer having an irregular particle structure as claimed in claim 7 or 8, wherein the reaction of the Ti(IV) compound with the organic aluminum compound is carried out in a saturated hydrocarbon or a mixture of saturated hydrocarbons at a temperature of from -40°C to 100°C.
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10. The process for preparing a catalyst for preparing a homopolymer and/or copolymer having an irregular particle structure as claimed in one or more of claims 7 to 9, wherein the concentrations of the reactants in the starting solutions are from 0.1 mol to 9.1 mol of Ti(IV) compound/l of solvent and 0.01 mol to 1 mol of Al compound/l.
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The process for preparing a catalyst for preparing a homopolymer and/or copolymer having an irregular particle structure as claimed in one or more of claims 7 to 10, wherein the reaction of the components is carried out by adding the Ti(IV) component to the Al component over a period of from 0.1 minute to 60 minutes.

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